

WHAT IS CLAIMED IS:

1. An engine exhaust cleaning device comprising:
a particulate matter filter configured to collect particulate matter from exhaust gas in an exhaust passage;
5 a regeneration processing section configured to execute regeneration processing that raises temperature of the particulate matter filter to remove the particulate matter collected in the particulate matter filter by combustion of the particulate matter collected in the particulate matter filter; and
an idling speed raising section configured to raise the engine idling speed when the
10 engine idles during the regeneration processing of the particulate matter filter by the regeneration processing section.
2. The engine exhaust cleaning device recited in claim 1, further comprising
a fuel cut recovery engine speed processing section configured to raise a fuel cut
15 recovery engine speed during the regeneration processing of the particulate matter filter by the regeneration processing section.
3. The engine exhaust cleaning device recited in claim 1, wherein
the idling speed raising section is further configured to raise the engine idling
20 speed for a prescribed amount of time when the engine idles during the regeneration processing of the particulate matter filter, and after the prescribed amount of time has elapsed, returns the engine idling speed to a normal idling speed value, when the engine idles during the regeneration processing of the particulate matter filter.
- 25 4. The engine exhaust cleaning device recited in claim 1, wherein
the regeneration processing section includes an accumulated particulate quantity detecting section configured to detect the quantity of particulate matter that has accumulated within the particulate matter filter to determine regeneration timing to
regenerate the particulate matter filter when an accumulated particulate quantity reaches a
30 first prescribed quantity.

5. The engine exhaust cleaning device recited in claim 4, wherein
the accumulated particulate quantity detecting section includes
a filter pressure difference detecting sensor configured to detect a pressure
difference across the particulate matter filter,
5 an exhaust gas flow rate detecting section configured to detect an exhaust gas
flow rate, and
an accumulated particulate quantity computing section configured to compute
the accumulated particulate quantity that has accumulated in the
particulate matter filter based on the filter pressure difference detected by
10 the filter pressure difference detecting sensor and the exhaust gas flow rate
detected by the exhaust gas flow rate detecting section, and
the regeneration processing section is further configured to determine the
regeneration timing to regenerate the particulate matter filter by comparing the accumulated
particulate quantity computed by the accumulated particulate quantity computing section
15 with the first prescribed quantity.

6. The engine exhaust cleaning device recited in claim 4, wherein
the regeneration processing section is further configured to end the regeneration
processing of the particulate matter filter by the regeneration processing section by
20 comparing the accumulated particulate quantity with a second prescribed quantity that is
less than the first prescribed quantity .

7. The engine exhaust cleaning device recited in claim 1, wherein
the regeneration processing section is further configured to increase the
25 temperature of the exhaust gas by adjusting at least one of the following: a timing of a
main fuel injection used for controlling the engine torque, a timing and quantity of a post
fuel injection executed after the main fuel injection, a cross sectional area of an air intake
passage opening, a supercharging pressure produced by a supercharger, and a flow rate of
exhaust gas recirculated from the an exhaust passage to an air intake passage.

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8. The engine exhaust cleaning device recited in claim 2, wherein
the idling speed raising section is further configured to raise the engine idling
speed for a prescribed amount of time when the engine idles during the regeneration
processing of the particulate matter filter, and after the prescribed amount of time has
5 elapsed, returns the engine idling speed to a normal idling speed value, when the engine
idles during the regeneration processing of the particulate matter filter.

9. The engine exhaust cleaning device recited in claim 8, wherein
the regeneration processing section includes an accumulated particulate quantity
10 detecting section configured to detect the quantity of particulate matter that has
accumulated within the particulate matter filter to determine regeneration timing to
regenerate the particulate matter filter when an accumulated particulate quantity reaches a
first prescribed quantity.

15 10. The engine exhaust cleaning device recited in claim 9, wherein
the accumulated particulate quantity detecting section includes
a filter pressure difference detecting sensor configured to detect a pressure
difference across the particulate matter filter,
an exhaust gas flow rate detecting section configured to detect an exhaust gas
20 flow rate, and
an accumulated particulate quantity computing section configured to compute
the accumulated particulate quantity that has accumulated in the
particulate matter filter based on the filter pressure difference detected by
the filter pressure difference detecting sensor and the exhaust gas flow rate
25 detected by the exhaust gas flow rate detecting section, and
the regeneration processing section is further configured to determine the
regeneration timing to regenerate the particulate matter filter by comparing the accumulated
particulate quantity computed by the accumulated particulate quantity computing section
with the first prescribed quantity.

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11. The engine exhaust cleaning device recited in claim 9, wherein
the regeneration processing section is further configured to end the regeneration
processing of the particulate matter filter by the regeneration processing section by
comparing the accumulated particulate quantity with a second prescribed quantity that is
5 less than the first prescribed quantity .

12. The engine exhaust cleaning device recited in claim 8, wherein
the regeneration processing section is further configured to increase the
temperature of the exhaust gas by adjusting at least one of the following: a timing of a
10 main fuel injection used for controlling the engine torque, a timing and quantity of a post
fuel injection executed after the main fuel injection, a cross sectional area of an air intake
passage opening, a supercharging pressure produced by a supercharger, and a flow rate of
exhaust gas recirculated from the an exhaust passage to an air intake passage.

13. An engine exhaust cleaning device comprising:
particulate matter collecting means for collecting particulate matter from exhaust
gas in an exhaust passage;
regeneration processing means for executing regeneration processing that raises
temperature of the particulate matter collecting means to remove the particulate matter
20 collected in the particulate matter collecting means by combustion of the particulate matter
collected in the particulate matter collecting means; and
idling speed raising means for raising the engine idling speed when the engine
idles during the regeneration processing of the particulate matter collecting means by the
regeneration processing means.

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